U.S. Department of Transportation
Office of the Secretary of Transportation

GENERAL COUNSEL

400 Seventh St., S.W.
Washington, D.C. 20590

October 21, 1996

Mr. William F. Caton
Office of the Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Re: WT Docket No. 96-86

Dear Mr. Secretary:

Enclosed please find an original and nine copies of the Comments of the United States Department of Transportation in the above-referenced proceeding.

Respectfully submitted,

Paul Samuel Smith

Paul Samuel Smith
Senior Trial Attorney

Enclosures

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D. C. 20554

In the Matter of	)	
The Development of Operational, Technical, and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010	)	WT Docket No. 96-86

COMMENTS OF THE
UNITED STATES DEPARTMENT OF TRANSPORTATION

I. INTRODUCTION

The Federal Communications Commission ("FCC" or "Commission") through a notice of proposed rulemaking ("NPRM" or "Notice") adopted April 5, 1996, "seeks to address the present deficiencies in public safety wireless communications as well as its expanding spectrum needs." NPRM at 1. The United States Department of Transportation ("DOT" or "Department") commends the FCC for its timely attention to this subject and for its efforts on behalf of public safety agencies. The Department is the federal agency whose primary responsibility is the advancement of safety in all manner of transportation throughout the country. 49 U.S.C. §§101(a), 302(c). These comments are offered in order to contribute to the enhancement of the capabilities of public safety authorities nationwide.

Through its participation in this proceeding, DOT seeks to make several major points. The first is that the Department, through its operating administrations, is in all pertinent respects a public safety agency. Like all such agencies, its basic mission must not suffer from regulatory or technical changes that are intended to advance that public safety mission. The second is that the FCC should generally strive to encourage more efficient use of existing spectrum before it seeks to allocate or reallocate additional spectrum. Early resort to additional allocations is one of the factors that has contributed to the "deficiencies" that must now be remedied. The third is that public

safety agencies and service providers must have compatible communications systems. Specifically, the nationwide and even global scope of DOT's safety obligations requires this interoperability every day in a wide variety of circumstances.

The final point is that the universe of public safety agencies, services, and service providers is just too broad and too varied to admit of resolution by any single means or administrative proceeding. We urge the FCC to pursue the goals set here by instituting multiple proceedings that are more narrowly focused on a particular aspect of this universe. At least one such proceeding should be devoted to the difficult problem presented by spectrum used for both safety and other purposes. If the commercial or operational uses to which such spectrum is also put precludes any regulatory recognition of its safety aspects, public safety will surely suffer.

II. BACKGROUND

Congress has charged the Commission to examine public safety spectrum needs and to ensure that these needs are met through the year 2010. Sec. 6002, Omnibus Budget Reconciliation Act of 1993 ("OBRA 1993"), P.L. No. 103-66, 107 Stat. 312. The FCC and the agency responsible for administration of the spectrum used by the federal government, the National Telecommunications and Information Administration ("NTIA"), established the Public Safety Wireless Advisory Committee ("PSWAC") to study and offer recommendations on this subject. NPRM at 2. The Commission noted the "crucial role" of the PSWAC, and anticipated that its final report and the comments thereon would "establish a sufficient record for developing rules" intended to enhance wireless communications of public service agencies. NPRM at 8.[1] This proceeding was instituted to be the formal vehicle through which the Commission would receive that report and public comment and also propose rules. Id. The PSWAC issued its Final Report ("Report") on September 11, 1996.

Wireless communications among vehicles and vessels and stationary bases, in all modes of transport, are critical to safe operations -- to prevent, as well as to respond to, accidents of all kinds. Consequently, DOT is pleased to submit its comments in this proceeding. The Department supports spectrum auctioning as a vehicle to move spectrum to new markets and generate funding. However, particularly when the spectrum which supports safety and safety-of-life systems is concerned, the Department feels that great care must be exercised in administering this process.

These comments will first briefly describe the operating administrations or components within DOT whose missions are particularly germane to and potentially affected by the Commission's ultimate decisions in this matter. We will then address the PSWAC Final Report, on which the FCC has asked for comments. Finally, we discuss specific issues raised in the NPRM itself.

---

[1]/ Indeed, the Notice tracked the PSWAC organizational structure.

III. PUBLIC SAFETY AND THE DEPARTMENT OF TRANSPORTATION

The Department is comprised of various operating administrations, each of which is charged with specific aspects of DOT's basic mission of safe and efficient transport. All modes of transportation -- air, sea, and land -- are encompassed. DOT is itself the largest governmental user of spectrum outside of the Department of Defense. The Federal Radionavigation Plan ("FRP") is mandated by Congress and jointly prepared biennially by the Departments of Transportation and Defense. The FRP, which is the official source of information regarding policies and plans for federally provided radionavigation systems, includes timetables for decommissioning of land based federally provided radionavigation systems. The 1996 FRP has been expanded to describe DOT and DOD responsibilities and activities related to frequency management of the spectrum for radionavigation services.

A brief outline of the Department's operating responsibilities potentially affected by this proceeding follows.

A. Air Transportation

The Federal Aviation Administration ("FAA") is the primary federal agency responsible for providing a safe, secure, and efficient aerospace system, one that also contributes to national security. In addition to responsibilities as varied as the certification of aircraft and pilots and regulation of commercial space launch operations, the FAA also operates and maintains communications, navigation, and surveillance systems for the protection of the flying public. All of these systems function in such a manner as to be efficient and interoperable worldwide and, where required, in a manner that complies with international treaty obligations of the United States. The FAA operates and maintains the air traffic control system for both civil and military users, handling an average of two flights per second and daily moving over 1.5 million passengers safely to their destinations every day.

B. Water Transportation

The U.S. Coast Guard ("Coast Guard") is also a part of DOT. The Coast Guard has four main missions: maritime safety, maritime law enforcement, marine environmental protection, and national security. These require the Coast Guard to deploy and maintain navigation aids, patrol U.S. coastal areas and international waters, issue standards for vessel construction (including oil tankers), and operate a large fleet of vessels and aircraft.

The Coast Guard depends upon its wireless telecommunications systems, which are interoperable with vessels and systems throughout the world, for search and rescue telecommunications, for broadcasting urgent marine safety warnings to vessels, and for command and control communications with its vessels, aircraft, and other Federal and local public safety agencies. It operates a National Distress System of over 300 Very High Frequency ("VHF") antenna towers, covering coastal and inland waters of the U.S., including most metropolitan areas. The Coast Guard receives over 20,000

distress calls from recreational and commercial vessels each year over this system. It also operates eight high seas Communications Stations, as well as numerous aeronautical radio communications and maritime radionavigation stations. The Coast Guard relies, as well, on commercial wireless cellular and mobile satellite systems.

C. Surface Transportation

Surface transportation is the most common and extensive means of transportation within the United States. It encompasses all movements by motor vehicles as well as the nation's railroads. DOT operating administrations participate in all such movements. The Department *per se* has historically had more limited public safety spectrum requirements in this sphere. However, the FCC should be mindful that recent legislation has expanded the uses of spectrum in the service of public safety in surface transportation.

The Federal Highway Administration ("FHWA") promotes safe and efficient transportation through the development of the nation's interstate highway system. Although not itself a major direct user of spectrum, FHWA promulgates engineering standards, regulates motor carrier (trucking) safety, and sponsors programs among state and local agencies that involve accident detection, reporting, and management; traffic congestion; emergency response; and delivery of safety-related information to the traveling public and others.

The Intermodal Surface Transportation Efficiency Act of 1991 ("ISTEA") designated FHWA the lead federal agency for the development of technologies collectively known as the Intelligent Transportation System ("ITS"). With state and local governments as well as other public and private partners, FHWA promotes the development of systems that serve such purposes as advanced traffic control, vehicle location, crash avoidance, and enhanced communications for traditional public safety agencies. ITS technologies are designed to aid in assessing and reporting traffic, road, and weather conditions; facilitating emergency responses to natural disasters and accidents involving all modes of transportation; and enhancing the security of the traveling public. All are embraced within the ITS program, all promise more safe and efficient transportation, and all require spectrum.

The Federal Transit Administration ("FTA") is vitally important to the planning, funding, and operations of the nation's nearly 6,000 public transportation systems. In communities large and small, buses, light/commuter rail, subways, and vehicles dedicated to assisting the disabled, bring millions of citizens to work, to recreation, to medical care, and elsewhere. Public transit providers in both rural and urban areas do so safely and efficiently because of wireless communications between moving vehicles and base units that goes far beyond traditional dispatching functions: to monitor vehicle status and security, to provide for responses (by transit and/or local police and other public safety agencies) to incidents of all kinds, and to transmit operational data automatically.

The Federal Railroad Administration ("FRA") regulates the safety of the country's railroads and conducts research in support of improved rail transportation. The railroad

industry utilizes wireless communications via a sophisticated radio network to control train movements: for dispatching, safety monitoring, remote defect detection, and a variety of other safety-related purposes, such as natural disaster response. This network (the Railroad Radio Service) is coordinated via the Association of American Railroads to ensure constant access to clear channels. It is, and must be, interoperable nationwide, for track and equipment are shared among multiple freight railroads, Amtrak, and many commuter and light rail systems.

Thus, whether directly as a user (FAA, Coast Guard) or indirectly as a facilitator or overseer of safe and efficient transportation (FTA, FRA, FHWA), the Department is keenly interested in the use of spectrum to assure safety in transportation.

It is also warrants emphasis that the very spectrum that advances the public safety -- *e.g.*, air traffic control communications or vehicle and vessel traffic management systems -- also serves other interests, public and private -- *e.g.*, efficiency and economic growth. This shared use, unfortunately, receives little or no mention in either the PSWAC Report or the FCC's Notice. Although this factor may complicate the Commission's decisions, it is nonetheless both very relevant and material to the subject at hand. The concern properly expressed in this proceeding for public safety providers and public service providers requires that some attention be paid to this subject as well. The Department looks forward to working closely with the Commission and others in order to address this point and to meet the other goals of this proceeding.

IV. THE PSWAC FINAL REPORT

On September 11, 1996, the PSWAC released its Final Report. It confirms the FCC's expectations of its importance. The Report is both comprehensive in its scope and specific in its conclusions. The Report immediately identifies practical realities in the public safety community, including a more accurate picture of its true extent, and offers recommendations for action now and in the future. The Department overall strongly endorses the PSWAC Final Report and urges the Commission to give it careful consideration.

DOT considers that there are several recurring points made in the Report that bear particular attention. The first is a simple but often overlooked truth: "No responsibility is more fundamental and reflective of the nation's values than that of its Public Safety agencies." Report at 5. The second is that wireless communication is "critical" to the ability of public safety agencies to protect lives and property. Id. at 1, 5. The third is that communications interoperability among (and within) public safety agencies is "an absolute requirement" for both day-to-day and coordinated disaster-response operations. Id. at 2, 6, 19.[2] The fourth is that agencies within the federal government, too, function as public safety agencies in a manner very similar to, and facing many of

[2]/ Public safety agencies, in turn, require interoperable radio communications with public service providers. Id. at 20.

the same constraints as, traditional state and local agencies. Id. at 13, 15.[3] The Department in particular is such an agency.

These comments have already outlined the varied ways in which DOT operating administrations advance public safety in the context of transportation. The personnel within DOT and its transportation constituencies discharge their obligations in large measure the same way as their local and state counterparts -- by wireless communications. They do so via mobile and fixed units both in daily exchanges and in emergency circumstances. Particularly in the latter event, the need for interoperability expands to include state and other federal entities. See Report at 2, 6, 13, 15, 20.

The PSWAC Final Report identifies the relevant major problems of the public safety community as frequency congestion, inadequate interoperability, and a lack of application of advanced technology. Id. at 2.[4] PSWAC accordingly has recommended that more spectrum be allocated for public safety agencies, that interoperability be embraced (such as by sharing federal spectrum with non-federal public safety users), and that commercial services be used for non-mission critical communications. Id. at 3-4, 21-25. We address each of these in turn.

Historically, DOT has faced a shortage of spectrum in some critical areas. For example, the internationally-allocated VHF Maritime band, used extensively by the Coast Guard and the maritime community for safety purposes, has only limited availability in the U.S. Congestion in this band is severe; consequently many safety and other communication needs in this band go unmet. In addition, in order to meet new or expanded aeronautical safety services, the FAA has initiated reallocation of additional spectrum for uses such as aeronautical mobile communications, navigation, and surveillance.

Moreover, the scheduled transferral of spectrum by the Department to the FCC for potential use by the private sector or others, budgetary concerns, regulatory changes, and, technological advances -- all of which generate an increased demand for spectrum or spectrum capacity -- are factors that together make the Department uncertain about the future adequacy of spectrum currently allocated for such public safety missions. Insofar as our public safety obligations are virtually certain to continue, we tentatively support the allocation of additional spectrum for public safety agencies.

DOT emphasizes, however, that increased efficiency in the use of spectrum by traditional public safety entities could supply much of the capacity now sought for public safety purposes. We therefore strongly support exploiting all feasible efficiencies in

---

[3]/ The noteworthy differences highlighted in the Report, geographic scope and national security concerns, only emphasize the importance of adopting policies that assure public safety agency needs are met. Id. at 15.

[4]/ The Report warns that "unless immediate measures are taken to alleviate spectrum shortfalls and promote interoperability, Public Safety agencies will not be able to adequately discharge their obligation to protect life and property in a safe, efficient, and cost effective manner." Id.

advance of additional allocations of spectrum (including spectrum sharing and new technologies and standards), so long as there is no threat to existing safety users (and providers), both federal and non-federal. The PSWAC is correct when it observes that there is "no single solution" to the telecommunications problems confronting public safety agencies and providers. Report at 4.

DOT is not opposed to the sharing of federal spectrum with non-federal public safety agencies whenever possible, and when consistent with DOT safety missions. Report at 22. For example, common frequency channels could be used during situations that require a coordinated federal/state/local government response. Federal or state or local government communications channels would be appropriate for such use. This could enhance interoperability in such situations. Such sharing would have to be carefully studied and implemented, however. As the PSWAC Report cautioned, public safety agencies have unique operating requirements (*e.g.*, dedicated capacity and/or priority access available at all times, high reliability or redundancy, ubiquitous coverage, and so forth) which must not be compromised. Id. at 14.

The Department is of the same view about reliance upon commercial services for non-mission critical communications. This option may offer the promise of reducing spectral demands on the Commission and financial demands on public safety agencies. Such a step would first require a high level of confidence both that non-critical communications could be clearly identified and that appropriate spectrum, interoperable equipment, and so forth would be always available for critical communications.

In conclusion, the Department of Transportation is intimately concerned with and directly responsible for public safety. DOT largely endorses the PSWAC Final Report and looks forward to working with the PSWAC, the Commission, and the NTIA on these issues of interest to the public safety community.

V. THE FCC NOTICE OF PROPOSED RULEMAKING

The Commission's Notice contains a short introductory section and then discusses the following categories of issues: Interoperability, Operational, Technology, Spectrum Allocation, Transition, and Competition. The Department addresses the issues raised in the Commission's Notice in the order presented.

Overview and History of Public Safety Communications

The Commission's brief recitation of the history of public safety communications serves to demonstrate the true breadth of such communications today and the difficulties presented by continued reliance upon historically narrow definitions. For example, the FAA and Coast Guard missions of aeronautical and maritime safety, respectively, clearly make them public safety agencies, yet neither is covered within the current narrow definitions associated with Public Safety Radio Services. NPRM at 3-5.

The definitions advanced by PSWAC and proposed for adoption by the FCC appear to go a long way "to encompass the broadest array of the responsibilities and functions performed by [federal] public safety agencies." NPRM at 10. Unfortunately, even these

definitions do not appear to recognize those public and private entities that use wireless communications for both safety and other purposes. Local public transit providers, for example, use wireless communications to dispatch their vehicles as well as to monitor their safety and security; private rail and motor carriers do the same. Again, the widespread use of spectrum to accomplish both safety and other purposes must be addressed. If the Commission promulgates rules that do not recognize the safety element of such combined spectrum uses, public safety may suffer.

Interoperability Issues

"Public Safety" Definitions

The definitions of "Public Safety," "Public Safety Services," and "Public Safety Services Providers" recognize the role of the federal government in providing public safety services and we endorse them. NPRM at 10, ¶24. As noted, however, neither those definitions nor the others proposed seem to reach the public safety aspects of other spectrum users. Id. For example, the Commission acknowledges that railroads require reliable radio communications "in either avoiding the occurrence of [ ] hazards or responding to emergency circumstances." Id at ¶25. The same may be said of others, such as public transit agencies and public and private users of ITS technologies. DOT urges the Commission to broaden its recognition of the real extent of safety uses of wireless communications by accepting that the pubic safety aspects of such mixed uses of spectrum warrant protection. This should be addressed as a specific subject for study.

Interoperability Needs

The FCC states that the "need for interoperability in public safety communications arises in three general contexts" -- day-to-day operations, mutual aid incidents, and emergency preparedness events or task force operations -- and seeks comment "on whether there are other contexts in public safety communications in which interoperability is needed". NPRM at 12, ¶¶28-30 and 13, ¶31.

DOT believes that the Commission must recognize that these same contexts also have an international aspect for communications between public safety agencies or organizations and mobile units of any nationality, operating within or affecting U.S. areas of responsibility. These include day-to-day operations, such as vessel and air traffic services and safety broadcasts, and mutual aid incidents, such as maritime distress cases. Moreover, these concerns are not exclusively federal in nature. For example, the requirement for international interoperability during any emergency significantly affects the Coast Guard and any other vessels involved in the emergency, including state and local harbor police and fire units. The same holds true for the FAA in the event of an air disaster or hijacking. Both the Coast Guard and the FAA use telecommunications frequencies and techniques prescribed by the International Telecommunications Union ("ITU") in order to communicate with ships and aircraft of all nationalities entering the United States.

Interoperability Options

The Commission in this section of its Notice explores various options to satisfy the interoperability requirements of public safety agencies and reaches some tentative conclusions. NPRM at 14, ¶¶33-42. The first is to relocate all public safety

communications to a new band. Id, ¶34.

DOT has several concerns with this suggestion. First, we note that although migration of public safety services to a new band may resolve certain interoperability problems, migration would be a long and costly process. It may eventually simplify, but it does not solve, the problem of internationally interoperable safety telecommunications.

The second problem is a related one, presented by the useful life of existing public safety communications systems. NPRM at 14, ¶35. These represent significant investments (for the federal government as well as other entities), and the life cycle of this equipment, its replacement costs, funding availability, and other indirect costs of migration must be addressed before deciding upon this option.

Third, relocating all public safety functions to one band may preclude the most advantageous mix of different technologies that could be used to support public safety services. This may also hinder the successful introduction of emerging and innovative technologies that otherwise may significantly promote safety. For example, certain ITS technologies function best using mobile radio (like emergency vehicle route guidance), and some are best implemented using Dedicated Short Range Communications ("DSRC").[5] Additionally, one band may not serve the public interest best, due to different requirements of different safety entities. For example, public safety users in densely populated areas may find it preferable to build systems that have high capacity but require a large investment in base stations, for example in the 800 MHz range. This may ultimately be the appropriate economic decision for authorities in such areas, but it likely would not be for rural areas. For them, greater distances can be covered with fewer base stations by systems in the 150-470 MHz band, at significantly lower costs. This would make spectrum sharing problematic.

One promising approach to provide for interoperability among federal, state, and local agencies is the designation of Universal Mutual Aid Channels. Id. at ¶39. This approach would lessen the financial impact of implementation. It could also be potentially useful in the internationally-recognized VHF maritime band.[6] DOT will cooperate in any effort toward this end. We also recommend that these Universal Mutual Aid Channels encompass an interoperable data service. The capacity of such channels will dictate their flexibility and usefulness. For example, if sufficient capacity is available, the channel could carry ITS data. At the same time, mandatory use of even a broad but very specific band of the spectrum could have adverse consequences for the application of the very technology

---

[5]/ DSRC serves diverse public safety functions. For example, it would permit law enforcement officers or others responding to emergencies to change traffic lights "on-the-fly." These technologies might be better suited to frequency bands that are not optimal for voice, other data services, or video. In fact, much activity is focused on placing these types of technologies in the 5.8 GHz band, and a certificate of spectrum for experimental use was granted by NTIA to FHWA for development of related applications.

[6]/ Due to congestion, particularly in the VHF maritime band, such a designation may have to await narrowband rechannelling.

that this proceeding seeks to foster.[7]

The Department also supports the proposal to install cross-band repeaters to achieve interoperability in emergencies. NPRM at 14, ¶¶37-38. It may also be possible to implement such a system relatively quickly, at least along the coastal areas and inland waters of the United States. DOT suggests that the Coast Guard National Distress System ("NDS") should be considered as the basis for such a system. The NDS is a network of approximately 300 VHF transceivers with antenna high-sites that are remotely controlled by regional communications centers to provide significant coverage. Current coverage is reasonably continuous through most of the Atlantic, Gulf and Pacific coasts, inland navigable waterways, and Great Lakes. The Coast Guard receives over 20,000 distress calls per year over this system, and also uses it for broadcasting urgent marine safety information to ships and boats, and for other safety and command and control telecommunications.[8]

The Department supports as well the establishment of a system of priorities for Universal Mutual Aid Channels. NPRM at 16, ¶40. DOT recommends that existing prioritization, already recognized internationally, be used for public safety to the maximum extent possible. For example, the ITU has established four priorities for safety telecommunications in maritime service, as recognized by Radio Regulation Articles N 39 and N 40. The maritime priorities include:

1. Distress - including alerts from and communications with a person or vessel in distress, as well as search and rescue communications and on-scene

---

[7]/ The Notice suggests, for example, that "a number of frequencies could be selected in one of the band segments between 30 and 800 MHz and designated for public safety communications. In addition, new public safety radio equipment could be required...to operate on these designated frequencies." NPRM at 14-15, ¶36. Implementation of this proposal could exclude as public safety radio equipment new and innovative technologies such as DSRC, which operates only above 900 MHz, and preferably at 5.8 GHz.

[8]/ The current system is only capable of operating on six fixed channels in the 156-157 MHz maritime band, but an enhanced NDS could be capable of operating over the band 156-174 MHz, which would cover all of the maritime and federal mobile radio bands. With proper planning and funding, this system could also conceivably include transceivers capable of operating on selected channels, such as the designated Universal Mutual Aid Channels, in the 154-156, 451-470, or 806-870 MHz, or similar bands used by state and local public safety agencies and organizations. During an emergency, at least one common working channel could be immediately established between vehicles or vessels, any federal agency, and most state and local safety agencies or organizations, using an enhanced NDS site working as a multiple cross-band repeater. The Coast Guard is soliciting comments on its Preliminary Operational Requirements for the NDS Modernization Project. If the Commission or others believe the Coast Guard should consider implementing such a cross-band repeater system for emergency interoperability in their National Distress System Project, then that recommendation should be submitted to the Coast Guard as early as possible.

communications;
2. Urgency - including medical emergency communications, cyclone and severe storm warnings, etc.;
3. Safety - including navigational and meteorological warnings, navigation safety, support communications for search and rescue; and,
4. Routine - including all other communications not described above.

There is a like hierarchy for civil aviation messages.

The Notice proposes to require that equipment for public safety use have a common communications mode and frequency band. NPRM at 16, ¶41. DOT agrees. We suggest that a forum of private manufacturers and any appropriate government user or government advisory representatives be formed, possibly co-chaired by the FCC and NTIA, to develop equipment standards to achieve these goals. These standards could mitigate interoperability difficulties, and, with production efficiencies and competition, reduce the financial obstacles to obtaining interoperable equipment.

The Commission also seeks comment on whether it should require all radios which are type accepted or sold for use on public safety frequencies to be capable of operating on the designated Mutual Aid Channels. NPRM at 16, ¶42. The Department wholly supports this approach. We recommend that this requirement take effect three years after these channels are designated. It would be futile to create a specially designated Mutual Aid Channel and then fail to require that all pertinent equipment be fully interoperable therewith.

Operational Issues

The FCC seeks comment on the types of communications services needed by public safety agencies, and specifically on the technical specifications required by and for these services. NPRM at 17, ¶46. To ensure interoperability, DOT recommends that communications systems remain capable of transmitting voice using conventional wideband and narrowband Frequency Modulation ("FM"), at least on the Universal Mutual Aid Channels.

Service Features

The Notice inquires about service features desired or required by public safety entities. NPRM at 18-19, ¶¶47-50. In addition to those listed, the Department believes that other currently available, technically proven services offer significant public safety benefits and would be desirable. The Global Positioning System ("GPS") provides worldwide position and timing data that is widely used within a variety of safety and other applications.[9] For example, the marriage of GPS and Geographical Information

[9] Through GPS, seamless global timing and positioning systems are possible and are scheduled for implementation within the next few years. For example, GPS, along with GLONASS, will form the basis of the Global Navigation Satellite System ("GNSS") for a seamless worldwide international aviation system endorsed by the International Civil Aviation Organization ("ICAO"). Interference with the GPS signal will interrupt the positioning or timing

Systems ("GIS") presents a real-time mapping and display capability that could greatly enhance the effectiveness of the public safety provider. The National Spatial Data Infrastructure ("NSDI") is creating a database of geospatial data shared between federal, state and local mappers, accessible through the Internet. Particularly for disasters, where mapping data may be obliterated, this provides a critical response tool. Current mapping data is essential for emergency and other services.

Additionally, the communications services mentioned in the Notice do not include other innovative technologies that aid public safety providers in fulfilling their missions. ITS technologies are a prime example. For example, through DSRC information about vehicles and/or the cargo carried by commercial vehicles is contained on tags affixed to the vehicles. Automatic readers download this data from the tag, a capability that is particularly important to public safety when hazardous materials are being transported. Following an accident or other incident involving these materials, this system permits faster, more appropriate response and clean up operations. This technology also automates safety checks of tractor trailers, truck crossings of international borders, customs and credential checks, etc. DOT accordingly urges the Commission to take a broader view as it seeks to inventory the wireless services functioning to advance public safety.

System requirements

The Department agrees with the Commission that "no one communications package will meet all the needs of each public safety agency." NPRM at 21, ¶55. Because the Coast Guard must communicate on an interoperable basis both on international maritime radio channels and on domestic channels used by public safety agencies, it is not possible to designate one telecommunication package to meet both requirements. For that reason, DOT recommends the use of cross-band repeaters, and possibly, the development of mobile radios capable of operating over most existing public safety channels.

Technology Issues

The Commission in this section reviews several major technologies, existent and emerging, that offer ways of increasing spectral efficiency. NPRM at 21, ¶24. DOT agrees with the FCC's emphasis on enhanced efficiencies and its reluctance to dictate the use of particular technologies. Id at 21, ¶66.[10] DOT agencies are committed to improving spectrum efficiency in the frequency bands that they utilize by such means as narrowbanding and receiver standards.[11] Moreover, as radionavigation systems such

---

signal it is providing. Protection against such interferences from other systems are critical.

[10]/ Such dictates could have hindered the use of new technologies useful to public safety, such as GPS, GIS, and ITS.

[11]/ Specifically, the Coast Guard is pursuing the feasibility of reducing the current 25 kHz spacing of the maritime mobile frequency band (156-164 MHz) to 12.5 MHz narrowband

as those discussed in the FRP are decommissioned, it will be appropriate to consider to which uses these frequency bands may be put. Such changes must allow those with older equipment to continue to operate in the same band through a reasonable transition period.[12] DOT also recommends that FM technology (wideband and narrowband) continue to be recognized for voice communications wherever possible, to ensure maximum interoperability opportunities.

Notwithstanding the Department's general reluctance to have certain technologies mandated, we nonetheless submit that certain standards are necessary in the interests of efficiency and interoperability. NPRM at 24, ¶68. Receiver standards, specifically noted by the Commission, are a prime example. Id. Poorly designed receivers in certain broadcast bands currently deny public safety users access to urgently needed spectrum in adjacent frequency bands. The adoption of receiver standards would mandate tighter tolerances for receivers, decreasing the potential for co-channel and adjacent channel interference.[13] Frequency assignments could then be made closer to known adjacent channel assignments, thereby freeing up spectrum for public safety and other purposes.

Spectrum Allocation

The Department agrees that "the demand for spectrum is usually not for spectrum *per se* but for increased capacity, which ultimately translates into more spectrum if the same technology is used". NPRM at 24, ¶71. We accordingly support exploiting available spectrum efficiencies before turning to additional allocations.[14]

FM, on an internationally coordinated basis, in order to relieve a severe shortage of channels in the U.S. and to allow the use of internationally recognized data channels.

[12]/ The NTIA has implemented a rechannelling effort in the Federal VHF band, 162-174 MHz, which will allow both FAA and Coast Guard to migrate to more spectrum-efficient operations in this band.

[13]/ Technical standards for transmitter and receiver out-of-band emission/filtering may have to be specified, particularly for users operating at the edge of a band. This is a case-by-case decision. Such standards can be developed most successfully by the public-private forum previously suggested. The FAA, for example, is an active participant in developing standards and practices that assist avionics manufacturers to build and performance-test equipment. The International Civil Aviation Organization ("ICAO") and federal advisory committees, such as RTCA, Inc., also provide input. In fact, the RTCA, Inc., is due out imminently with a report on the interference between Mobile Satellite Systems, GLONASS, and GPS.

[14]/ The Commission rightfully points out that one broadcast channel "utilizing today's broadcast television transmission standards occupies 6 MHz of spectrum" and that this "this same amount of spectrum could provide 480 channels (12.5 kHz each) for voice or data communications". NPRM at 24-25, ¶70. The Department supports making more efficient use of broadcast spectrum for public safety and other purposes.

Spectrum Allocation Options

The Notice asks for comment on a variety of regulatory approaches including "(a) allocation of additional public safety spectrum; (b) reallocation of spectrum currently assigned to Federal Government; (c) requirement of system sharing; (d) use of spectrum-efficient systems; (e) use of commercial wireless services; and (f) promotion of more efficient use of the spectrum allocated for public safety use." NPRM at 25, ¶72.

DOT suggests that the most pressing need for allocation of additional public safety spectrum is to enhance interoperability. The Department strongly urges that the Commission address the need for additional capacity by first encouraging the use of more spectrum-efficient technologies. This approach, particularly if employed across all users (specifically including FCC licensees), would obviate any perceived need to reallocate federal spectrum.

The Department in particular objects to reallocating to mobile users in certain of the specific frequency bands potentially identified by the Commission. NPRM at 26, ¶74. Although these bands may indeed be subject to reallocation, mobile users in this area of the spectrum would pose an unacceptable threat to aviation safety. Two of the bands identified are subject to reallocation to the FCC from the FAA (1710-1755 MHz and 1390-1400 MHz) and the Coast Guard (1710-1755 MHz), pursuant to the OBRA 1993. Mobile users in the 1390-1400 MHz band would most likely cause interference with the adjacent FAA Air Route Surveillance Radar ("ARSR") system. The Department has similar concerns should mobile systems occupy the 1710-1755 MHz band, for proximity of such users to an FAA Low Density Radio Communication Link ("LDRCL") system operation in the 1755-1850 MHz frequency band would have the same effect. Finally, given the admitted primacy of public safety and the role of DOT as a public safety agency, any consideration of reallocation of spectrum should include both federal and non-federal bands together, under similar rules.

Whether sharing spectrum among public safety agencies and other users is possible depends, in DOT's view, on the use to which the relevant spectrum is put. NPRM at 29, ¶79. Spectrum sharing may well be a possibility, for example, with some ITS technologies, or with the enhanced VHF Coast Guard system discussed, *supra*. On the other hand, there are cases where sharing is simply not currently possible. For example, even interference that is tolerable in other contexts and bands would be unacceptable and unsafe where aviation communications and navigation systems are concerned. The Department, therefore, is willing to explore spectrum sharing, so long as it does not threaten basic public safety missions.

DOT must for the same reasons oppose the FCC's mention of allocating the 335.4-399.9 MHz band to fixed and mobile stations and the 380-399.9 MHz band for public safety services. NPRM at 28, ¶77. The FAA uses the former band for air traffic control of military aircraft in FAA-controlled airspace. DOT objects to consideration of the latter band for reallocation because it is now used for air traffic control and tactical communications. The primary and secondary air-to-ground channel and each major UHF working channel used by all Coast Guard aircraft are contained in the 380-400 MHz band. Coast Guard aircraft actively use this band 24 hours per day, 365 days per

year, for missions including search and rescue, environmental protection, and law enforcement. Disruption of these Coast Guard operations would be intolerable. In addition, the FAA provides air traffic control services to military aircraft within this sub-band. The FAA currently has over 450 frequency assignments in the 380-400 MHz band to provide aeronautical mobile communications (route) safety services, such as approach control and en route communications, to military aircraft in all weather conditions. None of these is compatible with federal/state/local government public safety operations because of the potential for harmful interference. Because the loss of or interference with these bands could have potentially disastrous consequences, the Department objects to reallocation of these bands.

The NTIA proposal that public safety agency users should share federal and non-federal "multi-site trunked communications systems," properly structured (*e.g.*, by function, like law enforcement), holds promise. Id. at 30, ¶83. We therefore encourage the FCC to explore this option further.

The Commission notes that other bands may be suitable for public safety communications. NPRM at 28, ¶75. The Department agrees. We refer the FCC to NTIA's suggestion "that portions of the VHF television band (174-216 MHz) that will possibly be used for advanced television services [should] be considered as potential spectrum for land mobile uses." Id.

Transition

The Commission has tentatively concluded that the allocation of additional spectrum cannot serve as the basis for "a smooth transition" to the efficient, affordable, and interoperable public safety communications systems that are the goal of this proceeding. Id. at 31, ¶87. The Department agrees. A continuation of the historic pattern of simply assigning spectrum, even if it were available, would also extend the adverse consequences for efficiency and interoperability that led to the current situation. See Report at 3-5, 31. The financial, temporal, and other factors cited make it necessary to seek other transitional vehicles.

The use of commercial services by public safety entities suggested by the FCC may well be an appropriate one. NPRM at 31, 32, ¶89. These services appear to offer efficiency benefits and stimulate technology and competition, and they may reduce spectral congestion. Moreover, transitional use of these services for non-mission critical purposes could also serve as a laboratory in which to consider possible expanded uses in the future. Id. at 32, ¶90.

The funding necessary for any migration or consolidation of public safety spectrum uses is a major concern. Id. at 32-33. Financial constraints constitute a very real problem for federal users, as well as others. Particularly where the most basic of societal priorities is at stake -- public safety -- there should be no deterioration owing to migrations or acquisitions necessary to better serve that priority. With this important caveat, the Department recommends that the Commission explore further the possibilities of leveraging spectrum for this purpose in a manner that preserves all public safety needs and missions.

Competition

The FCC concludes tentatively that "any rules adopted in this proceeding should be technology-neutral" and requests comment on the implications of such rules for interoperability. NPRM at 35, ¶97. DOT wishes to emphasize again that we generally disfavor technology-restricting rules. However, in order to promote interoperability, some standards are clearly necessary. Threshold prescriptions or requirements that do not specify the manner in which a goal (such as interoperability) is achieved, for example, would foster competition and meet critical public safety needs.

VI. CONCLUSION

The Department exists to enhance safe transportation in the United States. Its mission is just as critical as those of other public safety agencies. The constraints it faces are just as real, if not more stringent. DOT hopes that this proceeding will lead interested parties to this and to other important conclusions.

One is about the true breadth of public safety services. They are provided by government entities at all levels. They are also provided by public and private entities in conjunction with other services and purposes. DOT considers that more than a single administrative proceeding is required to address this breadth adequately.

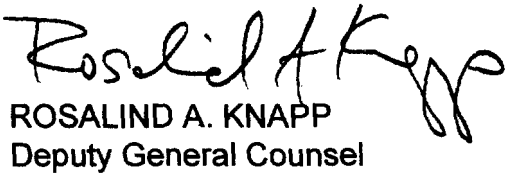
Another important point concerns the variety of the wireless technology employed in the provision of public safety services. It is a wide array: old and new, efficient and otherwise. It represents both a substantial existing investment and promising new developments. DOT believes that the proper lesson to be drawn here is that constraints on public safety technologies should be rationally drawn so that existing uses are preserved and evolving uses are encouraged.

The same can be said for spectrum allocations. The spectrum is a resource of critical importance and value. Allocation of remaining spectrum must be carefully done so that growth and innovations are promoted and current public safety services are preserved.

Finally, existing safety mission capabilities must be preserved in the course of enhancing those capabilities. Greater efficiency, sharing, and sound public policy will serve this end better than premature allocations or reallocations.

The Department commits to working with the Commission and others toward that enhancement.

Respectfully submitted,



ROSALIND A. KNAPP
Deputy General Counsel

October 21, 1996